made to carry out the operation on a large scale, the contact mass quickly became inert. This was the case even when the gases had been purified by passing through long pipes, repeated washing with sulfuric acid, and further passage through coke and asbestos filters. In following up the cause of the difficulty, it was found that extraordinarily small quantities of arsenic were capable of inhibiting the action of the platinum in the contact mass. The same is true of a few other substances such as mercury and perhaps phosphorus. These substances seem to have what may be considered a poisonous action upon the platinum. Investigation showed that the arsenic was contained in the fine white fume which is formed in all cases where sulfur is burned. This fume consists of finely divided sulfuric acid, and its complete condensation has been one of the unsolvable problems of technical industry, especially in connection with smelting plants. Eventually the problem was solved by the thorough washing and wet filtration of the slowly cooled gases, with water or dilute sulfuric acid.

After this purification from every trace of mechanical impurity, as was shown optically, it was found that the contact mass still lost its activity after a time, and here again patient investigation revealed the fact of arsenic poisoning. This was finally shown to be due to the action of the condensed sulfuric acid from the burners upon the iron condensers, whereby traces of arseniuretted hydrogen (arsin) were generated. This difficulty was easily overcome, but when the process was attempted on a large scale, it was still unsuccessful. When the pyrites burners were used to their full capacity, there was formed a fume which resisted every attempt at condensation. This was unconsumed sulfur, which, of itself harmless, contained minute quantities of arsenic, thus again poisoning the contact mass. The formation of this fume was prevented by the injection of steam into the burners, which has other advantages, in preventing the action of the condensed acid on the iron pipes, and in hindering the formation of hard dust scales in the cooling pipes and chambers. Other difficulties appeared in the cooling of the contact mass and in connection with the absorption of the sulfur trioxid, which is attended by a great development of heat, but they were slight in comparison with those which had attended the purification of the gases. At last the process was established on a commercial basis, as is shown by the fact that in the year 1900 the production of sulfur trioxid reached the amount of 116,000 tons.

The first interest of the process is of course for the manufacture of the concentrated and fuming acids, used largely in the color industry, but when it is considered that it is the concentrated acids which are most economically made in this manner, it is not difficult to foresee that in the near future the chamber process must be superseded for all acids which would require concentration in platinum stills. It is quite possible that the chamber process will continue to be used for many years to come, for the more dilute acids which require no concentration, but even so, the perfection of the contact process can be looked upon as little short of a revolution in this most important of the chemical industries.

J. L. H.

RELIEF SHIP FOR THE BRITISH ANTARCTIC EXPEDITION.

Sir Clements Markham, president of the Royal Geographical Society, has issued the following appeal to the Society's fellows:

It is with some reluctance that I appeal again to the fellows of the Society on behalf of the relief ship, which must leave England not later than July next to obtain news of, and render what assistance may be necessary to, the expedition on board the *Discovery*. I make this further appeal in the belief that the fellows as a body do not realize the situation, and entertain an erroneous impression as to how much is expected of each individually. I am assured that many, if not most, of the fellows of the Society feel that, unless they can each contribute a very considerable sum, it would be useless to do anything.

I am particularly anxious to disabuse the fellows of this impression; I assure them that we shall be glad to receive any contribution,

however small. If each fellow of the Society made himself responsible for £2, we should be in a position to send off the relief ship fully furnished with all requirements. It is not necessary that each fellow should contribute £2 out of his own pocket; if he gives what he himself can afford, he would probably have no difficulty in obtaining the balance in small contributions from his friends.

Out of the 4,000 or more fellows of the Society, only 150 have contributed to the funds for the relief ship. I cannot help thinking that when those fellows who have not contributed realize this they will come to the help of the council, without hesitation, in the manner I have suggested, or in some way equally effective. The council has made itself responsible for the relief ship. The vessel, the *Morning,* has been purchased, and is now in the Thames undergoing the necessary alterations. When these are completed, the balance of the sum subscribed will be quite insufficient to furnish her with the necessary stores and to provide an adequate equipment of officers and crew.

In the hope of enabling the fellows to realize the situation and the Society's responsibility, I give the following extract from the last despatch from Captain Scott, written just before the *Discovery* left New Zealand to make her way through the ice to her destination:

It is with great satisfaction that I learn that it is intended to send a relief ship. I had contemplated writing most urgently to you on this subject, knowing how absolutely our retreat would otherwise be cut off should any accident result in the loss of the *Discovery.* The conditions which surround the Antarctic lands with a belt of tempestuous ocean have always impressed me with the difference to those existing in high northern lands, and I have felt that, since our retreat by boats to any civilized spot is a practical impossibility, our movements, and the risks we could rightfully take, must be greatly limited, if the loss of the ship of necessity implied the loss of all on board.

I see that every effort will be made to despatch the vessel which you have already purchased for the purpose. It will, therefore, be a great relief and satisfaction to me to leave Lyttelton, confident that such efforts will be successful and that a line of retreat is practically secured to us.

I feel sure that after this statement the fellows of the Society may be relied on to support the council in an undertaking absolutely essential to the complete success of the National Antarctic Expedition.

THE U. S. GEOLOGICAL SURVEY.

IN the U. S. Geological Survey the Geologic Branch is reorganized by the appointment of Mr. C. Willard Hayes to the position of geologist in charge of Geology to take effect March 1, 1902. Mr. Hayes has been connected with the survey since 1887 and has served with ability in various relations as assistant geologist, geologist, and since 1900 as geologist in charge of investigations of non-metalliferous economic deposits. He is now placed in administrative control of the geologic branch in order that the director may be relieved of executive details and the organization may be strengthened by the undivided attention of its head to carrying out the director's general policy. By this appointment Mr. Willis, who since 1897 as assistant in geology to the director has performed the administrative work of geology, is freed from that duty and will be at liberty to give more attention to the division of areal and stratigraphic geology, of which he has charge. In announcing these changes at a meeting of geologists in the office of the survey on February 20, the director called attention to the plan of organization of the geologic branch set forth in the Twenty-first Annual Report, pages 20 and 21, and more fully elaborated in the forthcoming Twenty-second Annual Report. The fundamental idea of the organization is that scientific direction and supervision may be and in most cases should be separated from administrative control. Specialists are placed in charge each one of investigations in a particular subject, Messrs. Becker, Chamberlin, Day, Emmons, Hayes, Stanton, Van Hise and Willis having been thus appointed, but their authority is in general limited to consideration and approval of the scientific aspects of the work. Administrative authority remained immediately with the director, and is now in a degree transferred to the geologist in charge of geology, Mr. Hayes.